

# STATUS OF PTTI IN THE U.S. AIR FORCE

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## Abstract

*Throughout the world, Air Force activities rely on timing equipment calibrated and maintained by a network of Precision Measurement Equipment Laboratories (PMELs). These PMELs operate within guidelines established at Newark Air Force Base under the Air Force Metrology and Calibration Program. What will happen to the Program when the Newark base closes in October, 1996, a victim of government downsizing? This paper looks at the plan to privatize in place, i.e. to bring a contractor on site to perform the same workloads that are presently done by Federal workers. It discusses the reasons for privatization and looks at some of the changes expected to occur. Most importantly, it considers the problems involved and the potential impact of privatization on timing support throughout the Air Force.*

## INTRODUCTION

Many Air Force activities need precision timing systems for a variety of applications. These include tracking satellites in space, operating command and control communications networks, test ranges, radar warning systems, and other electronic surveillance programs. For precise time support, these activities rely on timing equipment calibrated and maintained by their local base Precision Measurement Equipment Laboratory (PMEL). Under the Air Force Metrology and Calibration (AFMETCAL) Program, PMELs located throughout the Air Force have a responsibility to provide precise time and frequency (PTTI) support to their area customers.

## NEWARK AIR FORCE BASE FUNCTIONS

The Directorate of Metrology (ML), located at the Aerospace Guidance and Metrology Center (AGMC) at Newark Air Force Base, Ohio, provides the capability for PTTI support at twenty-seven PMELs selected to meet that responsibility around the world. As managers of the AFMETCAL Program, ML provides those PMELs with the measurement standards and equipment, calibration procedures, and management data that they need. Equally important, ML analyzes new calibration requirements and provides an integrated planning function to assure that PMEL support for PTTI is in place when needed. Finally, ML provides technical assistance to all PMELs through its staff of engineers, technicians, and logisticians.

Another important function of the Directorate of Metrology is the operation and maintenance of its computer controlled Precise Time Reference Station (PTRS). Using the common-view

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technique, the station interfaces via modem to the United States Naval Observatory (USNO). ML receives timing data continuously from Global Positioning System (GPS) satellites and the LORAN-C system and compares it with signals from ML's master cesium beam frequency standard. Each day, the USNO extracts data from ML's PTRS and adjusts the master standard to maintain a reference with an uncertainty no greater than twenty nanoseconds. ML owns two additional cesium standards which it tracks against the master standard. Having this redundancy is useful in identifying the cause of any systematic problems which may occur in the PTRS.

ML has provided a Precise Time and Frequency Console (PTFC) to each PMEL with responsibility for timing support. The PTFC includes a cesium standard, GPS receiver, LORAN-C receiver, and the associated equipment required to maintain a time reference without additional support from ML. What then is the purpose for ML to maintain its PTRS? First, the PTRS provides what is officially recognized as the Air Force Standard for Time and Frequency. Using portable cesium standards, this reference can be transferred quickly to any PMEL or remote site to restore service lost to equipment failure or damage caused by man made or natural disasters. Secondly, the PTRS serves as an in-house reference for several activities at Newark Air Force Base which require a precise frequency reference. One of these is the Technical Repair Center for precision frequency standards, otherwise known as the Clock Shop. This activity, located in the Directorate of Maintenance, provides repair services for cesium, rubidium, and other types of precision frequency standards located throughout the Air Force. A third use of the PTRS is to provide ML the capability to test new time and frequency equipment prior to acceptance.

## **BASE CLOSURE**

Over the past two years, the draw down in Defense spending has had a major impact on Newark Air Force Base. In June, 1993, the Base Realignment and Closure Commission (BRACC) added Newark to the list of recommended base closures. By September, the closure was signed by President Clinton and approved by Congress. The closing date established as an Air Force goal is 1 October, 1996.

While many DOD installations have closed or are scheduled to close, Newark is different in one respect. The workload being performed at Newark is recognized as work that must continue to be performed there. Even though it is scheduled to close as an Air Force base, there is still a requirement to keep the facility open and operating to accomplish the same workload. To accomplish this, the Air Force has come up with the concept of privatization in place. Essentially, this means a contractor will take over the same facility and equipment used by the Government and continue to perform the same workload as the Government does now. This all becomes complicated by questions such as: a. Is the contractor expected to buy the facility and/or the equipment? b. What wage rates will the contractor pay? c. Will the contractor be able to retain the expertise of the present government work force? d. Who will ensure the contractor provides adequate support to the field? These issues and many more are being addressed now as a statement of work and request for bids are being prepared.

The Directorate of Metrology presents an especially sticky problem to the planners for base closure. After months of study, cost analysis and discussion, officials were able to convince first, the Air Force Materiel Command and later, the Base Closure Executive Group in Washington

D.C. that specific functions of the AFMETCAL Program must remain as government functions. These functions are calibration procedure management, laboratory certification, and equipment budgeting and acquisition. The remaining functions, including preparation of calibration procedures and all elements of the Air Force Measurement Standards Laboratories, will be privatized in place. This latter category includes the laboratory group responsible for the Precise Time Reference Station.

What will happen to the PTRS and what effect will privatization have on PTTI support for the Air Force PMELs? At this point, it is impossible to say with any certainty. Even major decisions are subject to change at any time. We know for sure the PTRS will be upgraded this fiscal year with three new cesium standards, a new GPS receiver, time interval counter, 486 computer, and other associated equipment. At this time, the plan is to turn the new system over to the privatization contractor as government furnished equipment when the base closes.

What will happen then depends upon the level of expertise brought in by the contractor and the interaction of the contractor with the remaining government personnel. We assume the contractor will want to retain the present Federal workers as much as possible. This may be possible in some cases and not in others because of each individual's situation. For example, how close to retirement is the person? How many social security credits does he have? Does he want to stay in the local area? The DOD's Priority Placement Program is working too well in providing employees other job opportunities in Government. By the time the base closes, there may be no expertise left for the contractor to use. There is supposed to be a one-year transition period, beginning 1 October 1995, during which Government personnel will be expected to train the contractors to take over their jobs. This experience should provide some interesting insights to human behavior.

Since the PMELs have a Precise Time and Frequency Console providing their time reference, they require little from Newark on a daily basis. If the contractor lacks expertise in this area, the impact on PMELs may be limited to the problem of technical assistance not being available. The impact at home may be much worse if accurate frequencies cannot be provided to local customers and new equipment cannot be tested with any validity.

"What will happen to Newark's Clock Shop?" is another question frequently asked by those customers who rely on the Clock Shop to repair their frequency standards. At this moment, it looks like the Clock Shop will remain an Air Force function and transfer to one of the large Air Force depots. If that happens, it would lose access to Newark's PTRS, but could still function well with the reference available through GPS. Again, the level of expertise in the Clock Shop could become a problem if that activity is relocated.

## OTHER ISSUES

Outside of base closure, another issue affecting the status of PTTI is the formal training provided by the Air Force. With the closure of Lowry Air Force Base in Colorado, the PMEL School located there was moved to Keesler Air Force Base in Mississippi. As far as we know, the PTTI Course is still being taught at the new location.

A final issue being addressed now is the loss of the overseas LORAN-C chains as the U.S. Coast

Guard turns over control of them to the host countries at the end of this year. Many overseas bases, beyond those having the PTFC, have depended on LORAN-C for a frequency reference. Anticipating there may be a problem with reliability under the host country arrangement, Newark has purchased cesium frequency standards for each of those bases, thereby eliminating their requirement for LORAN-C.

## **SUMMARY**

Stepping back for a broad look at the issues affecting PTTI in the Air Force, we see the closure of Newark Air Force Base as the number one potential problem. Uncertainty surrounds the whole concept of privatization in place and how it will be implemented at Newark. Planners are working hard to achieve a stable transition to a contractor environment but, at the same time, a steady stream of employees with decades of experience are leaving for new jobs.

## QUESTIONS AND ANSWERS

**WILLIAM WOODEN (DEFENSE MAPPING AGENCY):** Is the intent that the contractor will go and do all of these calibrations of all the sites that you have for the testing? Is that part of the plan?

**ROBERT BLAIR (USAF):** I'm not certain of that. That's to be determined. Right now that could create a sticky situation having one contractor verify that another contractor is living up to his obligation. That's part of the unknowns at the moment. Nothing will be firm probably until October of this year. At the level I'm at, I am the precise time technician, I'm not a manager. So I don't know if I would ever know the answer to that.

But I would certainly hope that there needs to be something in there to guarantee that the Air Force is going to continue getting what it's paying for.